



US006603139B1

(12) **United States Patent**
Tessler et al.

(10) **Patent No.:** US 6,603,139 B1
(45) **Date of Patent:** Aug. 5, 2003

(54) **POLYMER DEVICES**(75) Inventors: **Nir Tessler, Haifa (IL); Henning Sirringhaus, Cambridge (GB); Richard Henry Friend, Cambridge (GB)**(73) Assignee: **Cambridge Display Technology Limited, Cambridge (GB)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/673,122**(22) PCT Filed: **Apr. 16, 1999**(86) PCT No.: **PCT/GB99/01176**

§ 371 (c)(1),

(2), (4) Date: **Jun. 6, 2001**(87) PCT Pub. No.: **WO99/54936**PCT Pub. Date: **Oct. 28, 1999**(30) **Foreign Application Priority Data**

Apr. 16, 1998 (GB) 9808061

(51) **Int. Cl.⁷** **H01L 51/00**(52) **U.S. Cl.** **257/40; 257/290; 438/82**(58) **Field of Search** 257/40, 290; 438/82(56) **References Cited**

U.S. PATENT DOCUMENTS

5,331,138 A	7/1994	Saroya	.....	257/40
5,500,537 A	3/1996	Tsumura et al.	.....	257/40
5,596,208 A	1/1997	Dodabalapur et al.	.....	257/66
5,612,228 A	3/1997	Shieh et al.	.....	437/1
5,629,533 A	5/1997	Ackley et al.	.....	257/80
5,854,139 A	12/1998	Aratani et al.	.....	438/780
5,892,244 A *	4/1999	Tanaka et al.	.....	257/40
5,936,259 A	8/1999	Katz et al.	.....	257/40

FOREIGN PATENT DOCUMENTS

EP 0528662 2/1993

EP	0575187 A1	12/1993
EP	0716459	6/1996
EP	0717445 A2	6/1996
EP	0786820 A2	7/1997
FR	2360177	2/1978
WO	WO 90/08402	7/1990

OTHER PUBLICATIONS

Jackson et al., "Organic Thin-Film Transistors for Organic Light-Emitting Flat-Panel Display Backplanes," IEEE Journal of Selected Topics In Quantum Electronics, vol. 4, No. 1, Jan. 1998, pp. 100-104, XP002110213.

Database Inspec Online! Institute of Electrical Engineers, Stevenage, GB, MA E. Y. et al., "Organic Light-Emitting Diode/Thin Film Transistor Integration for Foldable Displays," Database Accession No. 6194905, XP002110246, and Conference Record of the 1997 International Display Research Conference and International Workshops on LCD Technology and Emissive Technology Proceedings of 1997 International Display Research Conference and Workshops, Toronto, Ont., Canada, 15-19 S, pp. L78-L81, 1997, Santa Ana, CA, USA, Soc. Inf. Display, USA.

(List continued on next page.)

Primary Examiner—Jerome Jackson

(74) Attorney, Agent, or Firm—Finnegan Henderson Farabow Garrett & Dunner LLP

(57) **ABSTRACT**

An integrated circuit device comprising: a current drive switching element having an input electrode, an output electrode, a switchable region comprising a semiconductive polymer material electrically coupled between the input electrode and the output electrode, and a control electrode electrically coupled to the switchable region so as to allow the application of a bias to the control electrode to vary the flow of current through the switchable region between the input electrode and the output electrode; and a second circuit element integrated with the switching element, and electrically coupled with the input electrode of the switching element for receiving a drive current from the switching element.

87 Claims, 9 Drawing Sheets

